APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/622,976	07/18/2003	Richard Daniel Colvin	2376.0016	3006

7590 06/25/2004	EXAMINER
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ART UNIT	PAPER NUMBER
2123	

MINNEAPOLIS, MN 55402-0903

DATE MAILED: 06/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	**Applicant(s)**
	10/622,976	COLVIN ET AL.
Office Action Summary	**Examiner**	**Art Unit**
	Kandasamy Thangavelu	2123

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *18 July 2003*.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-29* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-29* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☒ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *18 July 2003* is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

1.   Claims 1-29 of the application have been examined.

Drawings

2.   The drawings are objected to; see a copy of Form PTO-948 for an explanation.

Specification

3.   The disclosure is objected to because of the following informalities:

Page 14, Para 042, "CuWeight" appears to be incorrect and it appears that it should be "CumWeight".

Page 14, Para 045, "DistanceFrom Cell" appears to be incorrect and it appears that it should be "DistanceFromCell".

Page 20, Para 061, "CuWeight" appears to be incorrect and it appears that it should be "CumWeight".

Page 20, Para 064, "DistanceFrom Cell" appears to be incorrect and it appears that it should be "DistanceFromCell".

Page 20, Para 065, "the value associate with others cell" appears to be incorrect and it appears that it should be "the values associated with other cells".

Page 20, Para 066, "the value associate with other cells" appears to be incorrect

and it appears that it should be "the values associated with other cells".

Appropriate corrections are required.

Claim Objections

4.   The following is a quotation of 37 C.F.R § 1.75 (d)(1):

> The claim or claims must conform to the invention as set forth in the remainder of the specification and terms and phrases in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description.

5.   Claims 5, 7, 8, 15, 17, 18, 25, 27 and 28 are objected to because of the following

informalities:

In Claims 5, 15 and 25 the relationship,

"cumulative value = (CumWeightedValue/CuWeight) * CumWeightedArea" appears to

be incorrect and it appears that it should be

cumulative value = (CumWeightedValue/CumWeight) * CumWeightedArea.

In Claims 5, 15 and 25 the relationship,

"CumWeight = Σ (SpacingRadius - DistanceFrom Cell)/SpacingRadius" appears to be

incorrect and it appears that it should be

CumWeight = Σ (SpacingRadius - DistanceFromCell)/SpacingRadius.

In Claims 7, 17 and 27, "eliminating other targets within a predetermine distance

from an initial target" appears to be incorrect and it appears that it should be eliminating

other targets within a predetermined distance from an initial target.

In Claims 8, 18 and 28, "eliminating other targets within a predetermine distance from a initial target" appears to be incorrect and it appears that it should be eliminating other targets within a predetermined distance from an initial target.

Appropriate corrections are required.

Claim Rejections - 35 USC § 112

6.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7.   Claims 1-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 11 and 21 refer to "a plurality of values" which is vague and indefinite. What is the plurality of values claimed? What are the parameters on which they are based? How are they related to the three dimensional model? How are they related to the cell center locations and cell areas?

Claims 2, 12 and 22 refer to "a center point location with a value of interest" which is vague and indefinite. What is a value of interest? How is it determined?

Claims 9 and 19 refer to "selecting one of a certain percentage and a certain number of targets selected". "A certain percentage of targets selected" is vague and indefinite, since it is undefined in a method and system to select the targets.

Claims rejected but not specifically addressed are rejected based on their dependency on rejected claims.

Claim Interpretations

8.   In Claims 5, 15 and 25 the relationship,

"cumulative value = (CumWeightedValue/CuWeight) * CumWeightedArea" is interpreted as

cumulative value = (CumWeightedValue/CumWeight) * CumWeightedArea.

In Claims 5, 15 and 25 the relationship,

"CumWeight = Σ (SpacingRadius - DistanceFrom Cell)/SpacingRadius" is interpreted as

CumWeight = Σ (SpacingRadius - DistanceFromCell)/SpacingRadius.

Claim Rejections - 35 USC § 101

9.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

10.   Claims 11-20 are rejected under 35 U.S.C. 101 because they claim "a computer readable medium having computer executable instructions for performing stages comprising:", which is non-statutory subject matter. The computer program in a computer readable medium is not patentable.

The claims may be patentable if claimed as "a computer readable medium having computer executable instructions which when executed on a computer perform the stages

comprising:".

Claim Rejections - 35 USC § 102

11.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in-
> (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
> (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

12.   Claims 1, 4-9, 11, 14-19, 21 and 24-28 are rejected under 35 U.S.C. § 102(e) as being

anticipated by **Cullick et al.** (U.S. Patent 6,549,879).

12.1   **Cullick et al.** teaches determining optimal well locations from a 3D reservoir model.

Specifically, as per claim 21, **Cullick et al.** teaches a computer system, comprising a user

interface, memory storage means, and a processor coupled to the user interface and the memory

storage means (CL6, L30-32; CL7, L54-56); the processor operable to:

    filter a plurality of values in a three-dimensional model to eliminate values which are

below a threshold to create a filtered three-dimensional model (CL4, L3-11; CL5, L3-15; CL5,

L40-45; CL6, L32-36);

develop a first matrix from the filtered three-dimensional model representing a two-dimensional model of the reservoir, wherein the first matrix includes a plurality of cell center locations, cell areas, and the plurality of values (CL5, L40-48; CL9, 48-53);

develop a second matrix from the first matrix using a distance-weighted sum of the plurality of values (CL5 L16-27; CL7, L40-44; CL7, L44-51; CL7, L63-67; CL8, L30-44);

select target locations from the second matrix based on the distance-weighted sum of the plurality of values (CL5 L16-27; CL7, L40-44; CL7, L44-51; CL7, L63-67; CL8, L30-44); and

display on the user interface the selected target locations (CL6, L30-32; CL7, L54-56; Fig 3, Fig 4).

Per Claim 24: **Cullick et al.** teaches the processor filters the plurality of values using at least one user-defined filter(CL5, L40-45; CL6, L32-36).

Per Claim 25: **Cullick et al.** teaches the processor develops the second matrix by deriving a cumulative value associated with each center location using the relationship:

cumulative value = (CumWeightedValue/CuWeight) * CumWeightedArea (CL5, L16-27; CL7, L40-44); wherein

CumWeightedValue = Σ cellvalue*weight,

CumWeightedArea = Σ cellarea* weight (CL5, L16-27; CL7, L40-44; CL7, L44-51); and

CumWeight = Σ (SpacingRadius – DistanceFrom Cell)/SpacingRadius;

where SpacingRadius is a user-defined value and DistanceFromCell is defined as one of

the larger of an actual distance from a cell under consideration to an adjacent cell and half the

diagonal cell width (CL7, L44-51; CL7, L63-67; CL8, L30-44).

Per Claim 26: **Cullick et al.** teaches the processor selects target locations by determining

whether there are existing targets for the reservoir, and if existing targets are identified (CL1,

L41-47), eliminating possible targets within a predetermined distance from the existing targets

before selecting new targets (CL7, L63-67; CL10, L42-44; CL10, L61-62).

Per Claim 27: **Cullick et al.** teaches the processor selects target locations using an

iterative process of selecting the targets based on a first preferred value (CL6, L45-48; CL8,

L48-52), eliminating other targets within a predetermine distance from an initial target (CL7,

L63-67; CL10, L42-44; CL10, L61-62), and selecting a next preferred value for a next target

location (CL12, L45-65).

Per Claim 28: **Cullick et al.** teaches the processor selects target locations using an

iterative process of selecting a target based on a preferred value (CL6, L45-48; CL8, L48-52),

eliminating other targets within a predetermine distance from a initial target (CL7, L63-67;

CL10, L42-44; CL10, L61-62), and selecting a next preferred value for a next target location

(CL12, L45-65).

12.2   As per Claims 1, 4-8, 11 and 14-18, these are rejected based on the same reasoning as claims 21 and 24-28, supra. Claims 1, 4-8, 11 and 14-18 are method and computer readable medium claims reciting the same limitations as 21 and 24-28 as taught throughout by **Cullick et al.**

Per claim 19: **Cullick et al.** teaches that selecting target locations further comprises selecting one of a certain percentage and a certain number of targets selected. (CL12, L45-65).

12.3   As per Claim 9, it is rejected based on the same reasoning as claim 19 supra. Claim 9 is a method claim reciting the same limitations as 19, as taught throughout by **Cullick et al.**

Claim Rejections - 35 USC § 103

13.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

14.   The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1.   Determining the scope and contents of the prior art.
2.   Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. Claims 2, 3, 12, 13, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Cullick et al.** (U.S. Patent 6,549,879) in view of **Bush** (U.S. Patent Application 2003/0204311).

15.1 As per claim 22, **Cullick et al.** teaches the computer system of claim 21. **Cullick et al.** does not expressly teach that the processor develops the first matrix by windowing one or more cells from the filtered three-dimensional model to determine a center point location with a value of interest. **Bush** teaches that the processor develops the first matrix by windowing one or more cells from the filtered three-dimensional model to determine a center point location with a value of interest (Fig. 2, Fig 5 and Fig 14; Page 4, Para 0040; Page 5, Para 0083 and Para 0084), as that allows distinguishing cells characteristic of hydrocarbon reservoirs from areas without hydrocarbon reservoirs (Page 4, Para 0040); and to create scores relating to sub-areas of the area wherein high and low scores indicate the presence or absence of objects within the given area (Page 4, Para 0043). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the computer system of **Cullick et al.** with the computer system of **Bush** that included the processor developing the first matrix by windowing one or more cells from the filtered three-dimensional model to determine a center point location with a value of interest. The artisan would be motivated because that would allow distinguishing cells characteristic of hydrocarbon reservoirs from areas without hydrocarbon reservoirs; and to create

scores relating to sub-areas of the area wherein high and low scores indicate the presence or absence of objects within the given area.

15.2   As per claim 23, **Cullick et al.** and **Bush** teach the computer system of claim 22. **Cullick et al.** does not expressly teach that the processor determines the windowing of the one or more cells based on the number of layers in the filtered three-dimensional model of the reservoir. **Bush** teaches that the processor determines the windowing of the one or more cells based on the number of layers in the filtered three-dimensional model of the reservoir (Page 4, Para 0040; Page 5, Para 0083 and Para 0084; Page 6, Para 0088), as that allows distinguishing cells characteristic of hydrocarbon reservoirs from areas without hydrocarbon reservoirs (Page 4, Para 0040); and to create scores relating to sub-areas of the area wherein high and low scores indicate the presence or absence of objects within the given area (Page 4, Para 0043). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the computer system of **Cullick et al.** with the computer system of **Bush** that included the processor determining the windowing of the one or more cells based on the number of layers in the filtered three-dimensional model of the reservoir. The artisan would be motivated because that would allow distinguishing cells characteristic of hydrocarbon reservoirs from areas without hydrocarbon reservoirs; and to create scores relating to sub-areas of the area wherein high and low scores indicate the presence or absence of objects within the given area.

15.3   As per Claims 2, 3, 12 and 13, these are rejected based on the same reasoning as Claim 22 and 23, supra. Claims 2, 3, 12 and 13 are method and computer readable medium claims

reciting the same limitations as Claims 22 and 23 as taught throughout by **Cullick et al.** and **Bush.**

16.   Claims 10, 20 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Cullick et al.** (U.S. Patent 6,549,879) in view of **Kocberber** (U.S. Patent 5,740,342).

16.1   As per claim 29, **Cullick et al.** teaches the computer system of claim 21. **Cullick et al.** does not expressly teach that the computing platform triangulates a three-dimensional model before filtering the plurality of values. **Kocberber** teaches that the computing platform triangulates a three-dimensional model before filtering the plurality of values (Abstract, L6-13; CL6, L41-55), as that allows representing faces by a finite element grid and dividing the domain into non-overlapping convex polygons and non-overlapping n-dimensional triangles (CL5, L45-46; CL6, L48-52). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the computer system of **Cullick et al.** with the computer system of **Kocberber** that included the computing platform triangulating a three-dimensional model before filtering the plurality of values. The artisan would be motivated because that would allow representing faces by a finite element grid and dividing the domain into non-overlapping convex polygons and non-overlapping n-dimensional triangles.

16.2   As per Claims 10 and 20, these are rejected based on the same reasoning as Claim 29, supra. Claims 10 and 20 are method and computer readable medium claims reciting the same limitations as Claim 29, as taught throughout by **Cullick et al.** and **Kocberber.**
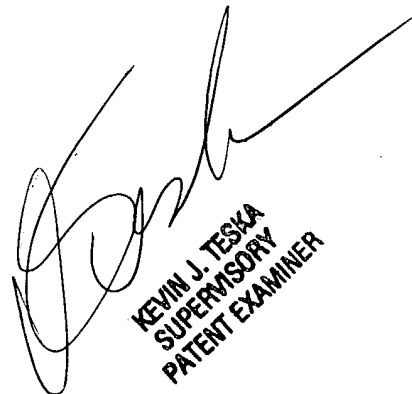
Conclusion

17.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kandasamy Thangavelu whose telephone number is 703-305-0043. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:30 PM.

If attempts to reach examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska, can be reached on (703) 305-9704. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-9600.

K. Thangavelu
Art Unit 2123
June 18, 2004

KEVIN J. TESKA
SUPERVISORY
PATENT EXAMINER